

**CLASSROOM INSTRUCTIONS**

**FOR**

**S T A R 5 0 0 0**  
**G P S**

**ARNAV - FLIGHT MANAGEMENT SYSTEM**

**CIVIL AIR PATROL AIRCRAFT**

**GROUP 11, HQ**  
**SOUTHEAST TEXAS**

**ARNAV - FLIGHT MANAGEMENT SYSTEM  
(GLOBAL POSITIONING SYSTEM RECEIVER)  
STAR 5000**

<b>NOTES:</b>	
<b>1.</b>	<b>DO NOT REMOVE THE DATA CARD - REMOVAL COULD DESTROY DATA ON THE CARD - THERE IS A PRESCRIBED PROCEDURE TO BE FOLLOWED.</b>
<b>2.</b>	<b>GPS RECEIVER IS FOR VFR NAVIGATION ONLY.</b>
<b>3.</b>	<b>BE ESPECIALLY CAREFUL WHEN EDITING OR DELETING WAYPOINTS.</b>

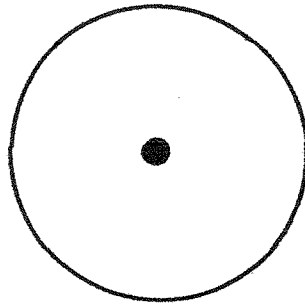
**WHAT IS GPS (GLOBAL POSITIONING SYSTEM)?**

- BASED ON 21 SATELLITES + 3 SPARES WHICH CIRCLE THE EARTH TWICE A DAY.
- ALTITUDE IS APPROXIMATELY 10,900 NAUTICAL MILES.
- WORLDWIDE VISIBILITY OF 4-11 SATELLITES 5 DEGS. OR MORE ABOVE THE HORIZON.
- NAVIGATION IS BASED ON THE INFORMATION FROM THE SATELLITES HAVING THE BEST GEOMETRY AND LOWEST DILUTION OF PRECISION (DOP) - THUS PROVIDING ACCURATE USER POSITION, ALTITUDE AND VELOCITY. DOP IS THE MEASURE OF POSITION ERROR BASED ON THE GEOMETRY OF THE SATELLITE. THE SMALLER THE DOP THE MORE ACCURATE THE DATA.
- GPS USES THE EQUATION:

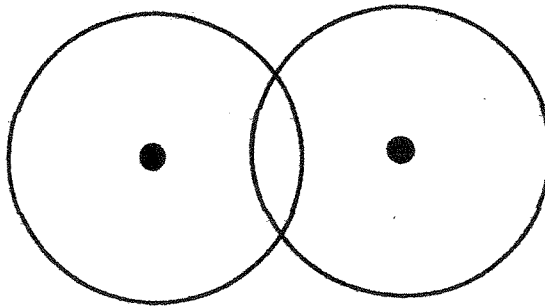
$$d = vt$$

- EACH SATELLITE SIGNAL CONTAINS THE TIME OF TRANSMISSION AND TRAVELS AT A KNOWN VELOCITY.
- THE RECEIVER THEN COMPUTES THE DISTANCE (THE UNIT IN N66059 IS NOT A GPS, BUT A GPS RECEIVER).

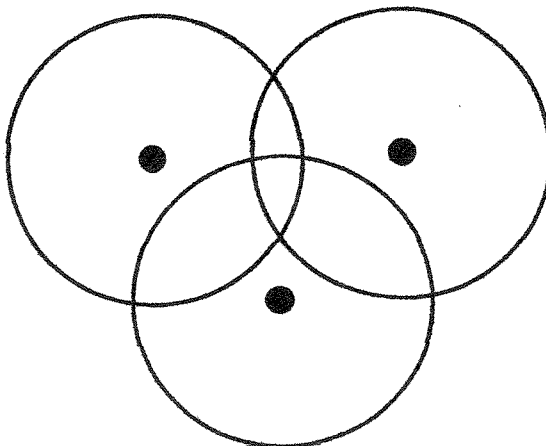
- FROM 1 SATELLITE, KNOWING YOUR DISTANCE PLACES YOU ON A SPHERE WITH THE SATELLITE IN THE CENTER:



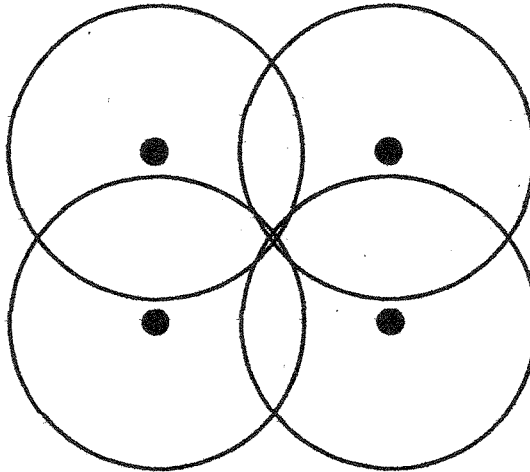
- KNOWING THE DISTANCE FROM 2 SATELLITES PLACES YOU ON THE CIRCLE OR INTERSECTION WHERE THE 2 SPHERES MEET:



- FROM A THIRD SATELLITE, YOUR POSITION WILL BE ONE OF TWO POINTS WHERE ALL THE RADII MEET:



- WITH 4 SATELLITES (OR MORE), THE RECEIVER WILL CALCULATE A VERY PRECISE 3D POSITION



### WHAT WILL THE GPS RECEIVER DO FOR YOU?

- GENERALLY, THE RECEIVER WILL:
  - ✓ Plot your bearing and distance to a destination.
  - ✓ Give ground speed, altitude, and deviation from course.
  - ✓ Constantly monitor the progress of your flight.
  - ✓ Give instantaneous latitude and longitude of current position.
  - ✓ Alert you when you approach a Special Use Airspace (SUA).
  - ✓ Locate 15 nearest airports, VOR's, or intersections.
- OTHER CAPABILITIES OF THE UNIT:
  - ✓ Displays local airport, VOR, or intersection information.
  - ✓ Displays MSA/MESA information.
  - ✓ Track information.
  - ✓ Calculates:
    - Δ Fuel range
    - Δ Winds aloft
    - Δ True airspeed
    - Δ Bearing between any two waypoints.

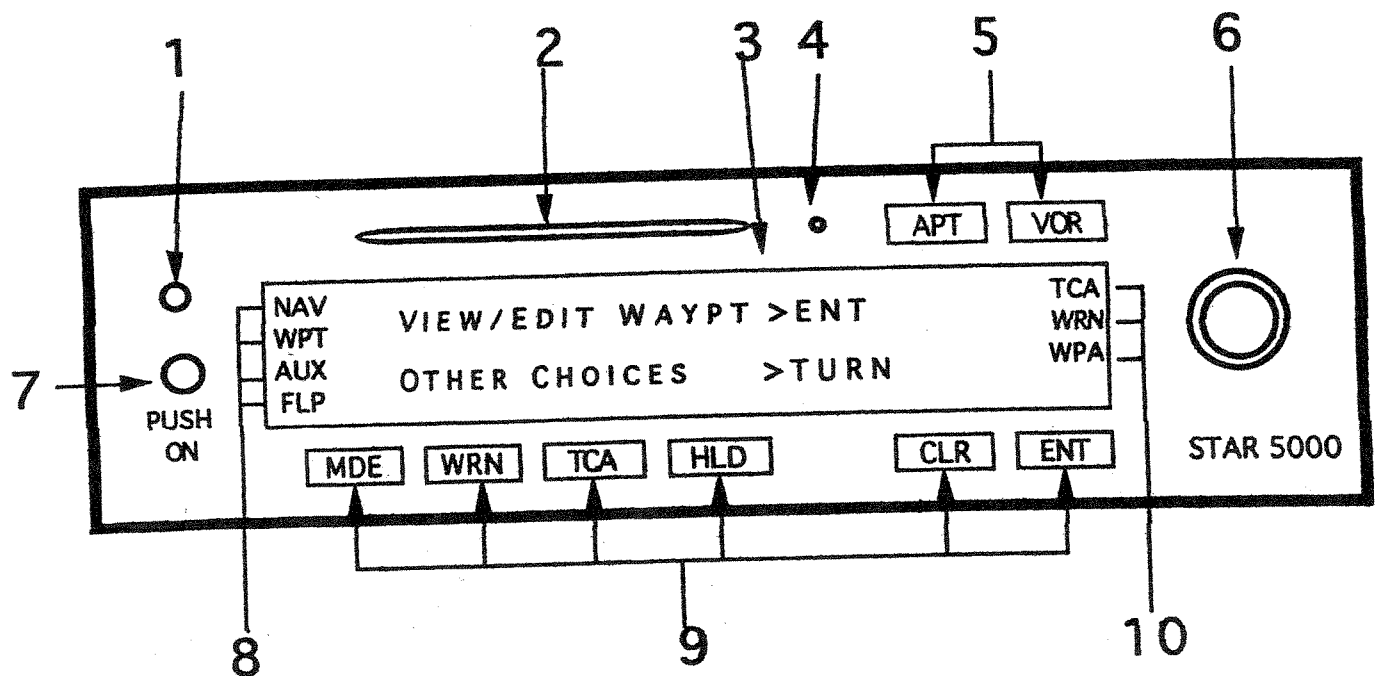
• YOU CAN

- ✓ Create a waypoint.
- ✓ Delete a waypoint.
- ✓ Rename a waypoint.
- ✓ Edit a waypoint.
- ✓ Create a route:

△ Between established waypoints.

△ Between user waypoints (such as a grid search).

INTRODUCTION



- 1 Auto Dimming Sensor
- 2 NavData Card Slot
- 3 Display Screen
- 4 Mounting Screw
- 5 Command Buttons
- 6 Selector Knob

- 7 Power Switch
- 8 Mode Indicators
- 9 Command Buttons
- 10 Warning/Alert Annunciators

- OPERATIONS ARE SIMPLE, FOLLOW DIRECTIONS ON THE DISPLAY SCREEN (I.E. TO VIEW OR EDIT WAYPOINT, PUSH ENT AND NEW PAGE WILL COME UP).

- IN EACH MODE THERE ARE PAGES AND SUBPAGES WHICH ARE VIEWED IN THE DISPLAY SCREEN.
- TURNING THE SELECTOR KNOB ALLOWS YOU TO SCROLL THROUGH THE PAGES (OR SUBPAGES).
- PUSHING THE KNOB IN WILL DISPLAY ADDITIONAL INFORMATION. DURING DATA ENTRY, PUSHING THE KNOB "SELECTS" THE CHARACTER DISPLAYED (SOME RECEIVERS YOU PUSH ENTER, BUT NOT THE 5000).

### COMMAND BUTTONS

- GIVE COMPLETE CONTROL, YOU CAN:

- ✓ Switch operation modes.
- ✓ search for nearest airports.
- ✓ Acknowledge alerts.
- ✓ Enter data.

- THERE ARE 8 COMMAND BUTTONS:

APT Search for 15 nearest airports.

VOR Search for 15 nearest VOR's or intersections.

MDE Use button to:

- Δ Cycle through the operating modes.
- Δ Also used to cancel any data entry and waypoint selection and backup to the previous screen.

WRN Display and acknowledge warnings, messages, and waypoint alerts.

TCA Display and acknowledge Special Use Airspace alerts (i.e. Prohibited, Restricted, MOA's, Class Airspace, etc.).

HLD Save current position, rename or just display.

CLR Use button to:

- Δ Backspace to a previous field.
- Δ Clear a field during data entry and editing.
- Δ Declare N&S, E&W when setting Lat., Long.
- Δ Declare + or - when setting temperature.

ENT Use button to:

- Δ Initiate destination selection.
- Δ Enter data.
- Δ Confirm data displayed.
- Δ Accept system recommendations.

## INDICATOR LIGHTS

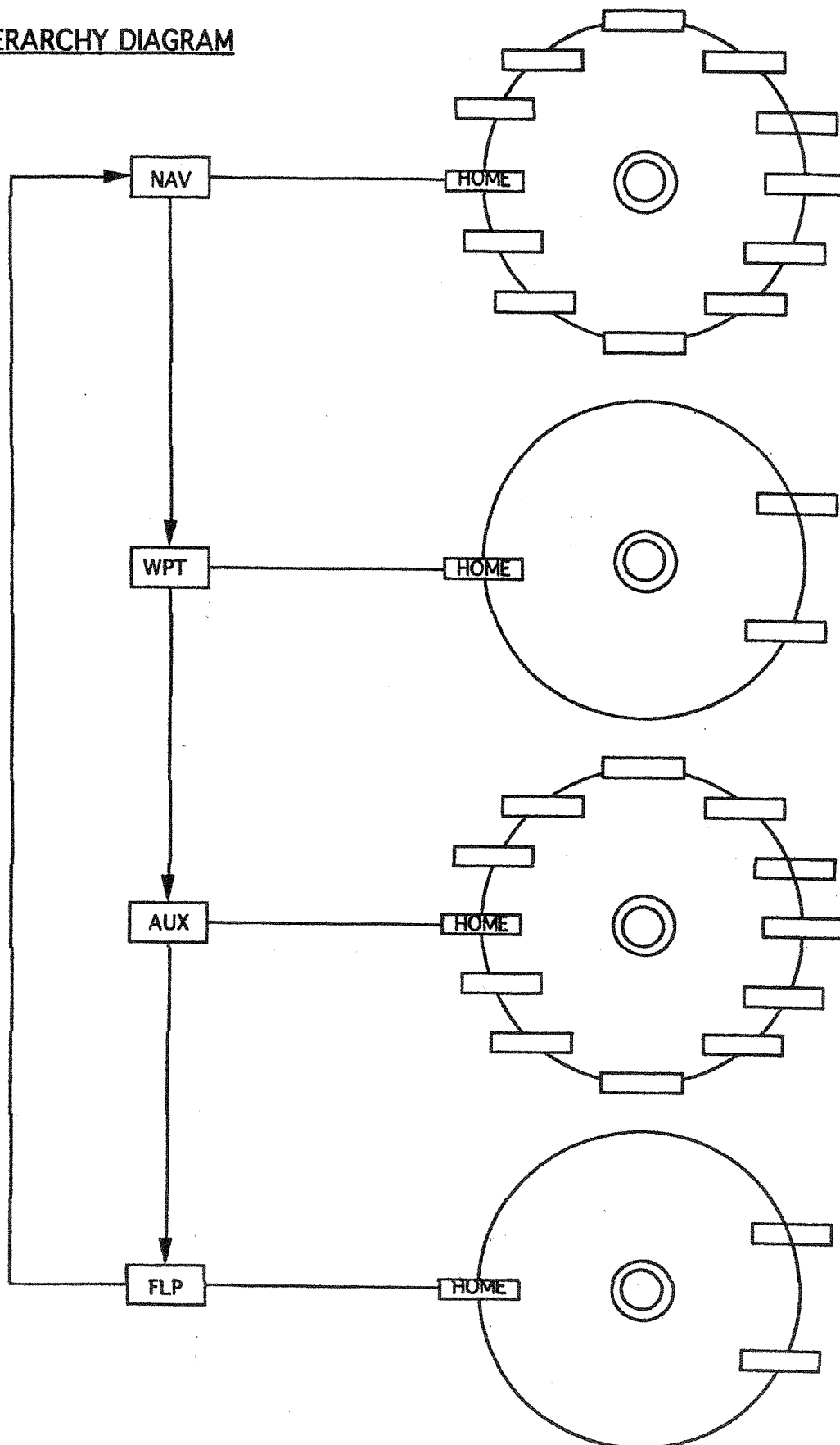
- THERE ARE 7 INDICATOR LIGHTS
  - ✓ NAV, WPT, AUX, FLP - indicate in which mode you are operating.
  - ✓ TCA - when:
    - Δ Flashing - Unacknowledged SUA alert.
    - Δ Steady - Acknowledged SUA alert (Push TCA Command button twice).
  - ✓ WRN - System alert.
  - ✓ WPA - Waypoint alert

## SOFTWARE

- UNIT IS ORGANIZED IN MODES.
- MODES ARE ORGANIZED IN
  - ✓ Pages
  - ✓ Subpages
  - ✓ Additional information pages

(HIERARCHY DIAGRAM FOLLOWS ON NEXT PAGE)

# HIERARCHY DIAGRAM





## MODE

NAV

## DESCRIPTION

- Displays course, bearing and distance to a waypoint, ground speed, winds aloft calculations, fuel calculations ETE, ETA, MSA, MESA, desired track, etc.

WPT

- Create, store, edit, name, and delete user waypoints.

AUX

- Miscellaneous operations (training, status pages, systems initializing, etc.

FLP

- Create, store, view, and edit flight plan routes.

## PAGES

- Screen is filled with information such as runway length, cross track error, winds aloft, etc.

- These pages let you view, enter, or modify data.

- Many pages contain simple, easy-to-follow directions such as ENT or TURN.

- When assessing a mode the HOME PAGE comes up - turning the knob will "flip" the pages.

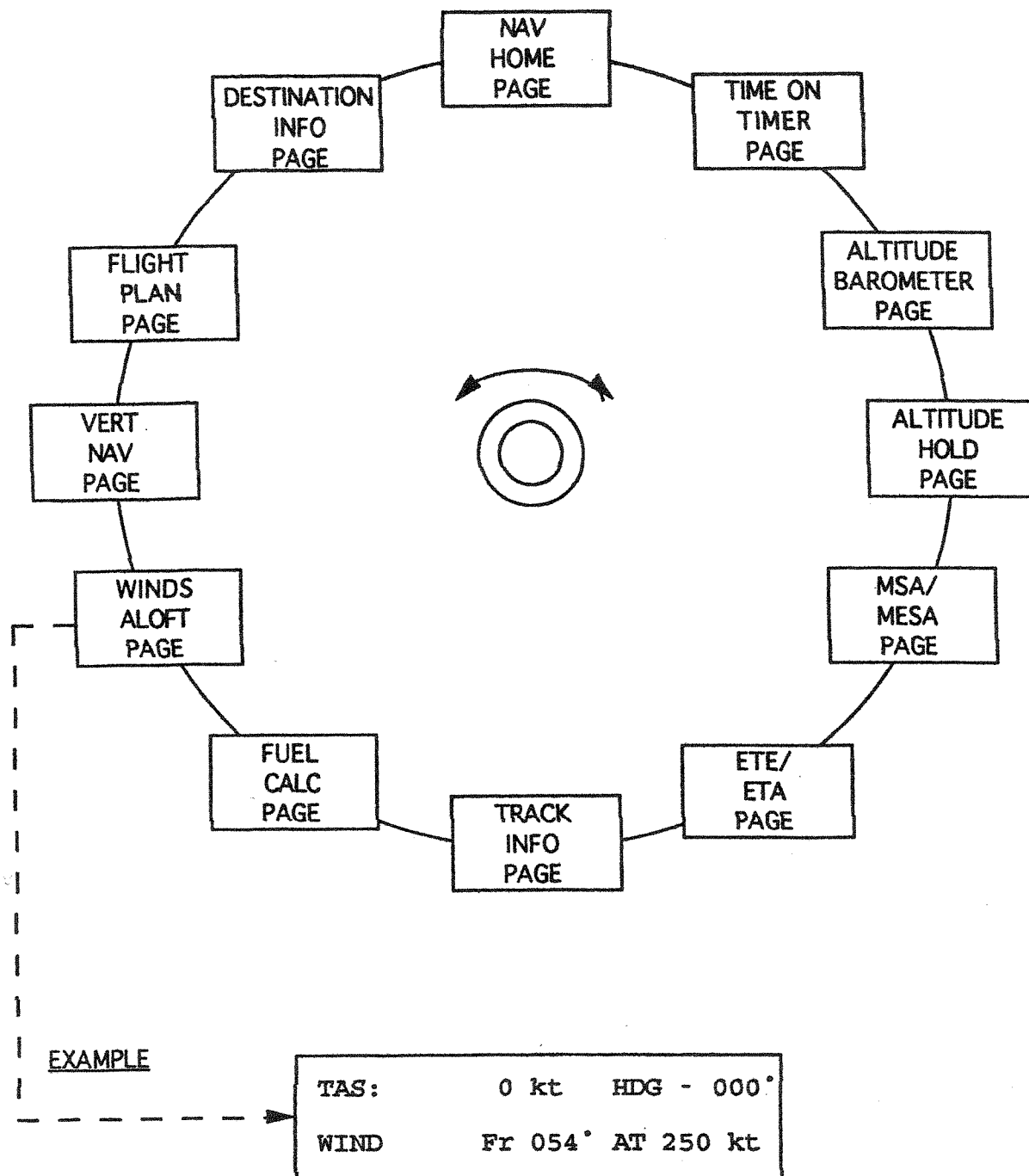
## SUBPAGES

- If you want to see a subpage press ENT while on the page and turn the knob for subpages. Most subpages will ask for data entry such as winds aloft.

## ADDITIONAL INFO. PAGES

- Can be viewed by pushing the selector knob. If none, nothing will happen.

I WON'T GO THROUGH ALL MODES, PAGES OR SUBPAGES. THIS CAN BE DONE REALTIME BY TURNING THE KNOB. HOWEVER, SINCE THE NAV MODE PRIMARILY WILL BE USED, LETS LOOK AT THE SETUP.



- ✓ Lets you display and recalculate wind aloft based on your heading and TAS
- ✓ TAS is calculated from IAS, OAT, and altitude.

- TO ENTER TAS PRESS ENT.

ENTER TRUE AIR	
SPEED:	000 kt

- ✓ Read IAS and OAT.
- ✓ Use standard entry method.
- ✓ Press ENT.

ENTER HEADING  000°
---------------------------

- ✓ Read DG.
- ✓ Press ENT (Winds aloft will display)

• CALCULATE TAS

- ✓ At HOME PAGE, push knob.

IAS:	0 kt	OAT	0°C
	ALTITUDE	00 kf	

- ✓ Press ENT.

ENTER INDICATED AIR  SPEED:                      000 kt
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- ✓ Use standard entry method.
- ✓ Press ENT.

ENTER OUTSIDE AIR  TEMP:                      00°
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- ✓ CLR will give + or -.
- ✓ Use standard entry method.
- ✓ Press ENT.

ENTER ALTITUDE  000 kf
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- ✓ Use standard entry method.
- ✓ Press ENT.
- ✓ Press selector knob

- BY NOW YOU KNOW ABOUT HARDWARE SETUP AND SOFTWARE ORGANIZATION.
- FOR DETAILED USE, USERS MANUAL IS IN THE AIRCRAFT.
- ALSO IN THE AIRCRAFT GLOVEBOX IS A POCKET CHECKLIST - THIS IS REALLY ALL YOU NEED TO BE THOROUGHLY FAMILIAR WITH THE UNIT. IT COVERS STEP-BY-STEP:

- ✓ Standard data entry method
- ✓ Fly to a WPT.
- ✓ Fly to a user WPT.
- ✓ Fly a route.
- ✓ Near-to search.
- ✓ Local APT search.
- ✓ Local VOR/INTX search.
- ✓ View ETE/Track/Altitude.
- ✓ View information for destination.
- ✓ Flight plans.
- ✓ Edit a route.
- ✓ Delete route.
- ✓ Create WPT by position.
- ✓ Create WPT by Rad./Dist.
- ✓ Set timers.
- ✓ Compute fuel.
- ✓ Compute TAS and winds.
- ✓ Change CDI scale.
- ✓ Set alt. and Baro. correction.
- ✓ Etc.

- STANDARD DATA ENTRY METHOD

- ✓ A field must flash before data can be entered.
- ✓ The ENT button is used to begin and terminate data entry.
- ✓ The CLR button is used to backspace and toggle between N&S, E&W, and + or -.
- ✓ Rotate knob to scroll through letters or numbers.
- ✓ Press knob (not ENT) to select character and advance to next character.
- ✓ After last character is selected, press ENT (not knob)
- ✓ Do not exit a display while flashing - data will be lost.
- ✓ To "escape" out of display, press MDE to return to HOME PAGE.
- ✓ As you work through a function with cues to press ENT, TURN or PUSH, read both lines of the display before finalizing.

AGAIN, MOST IMPORTANT !!!



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GOOD NAVIGATING TO YOU!!!